REMARKS

Reconsideration and allowance of the present patent application based on the following remarks are respectfully requested.

By this Amendment, claims 92 and 108 are amended to correct minor clerical mistakes. No new matter has been added. After entry of this Amendment, claims 82-124 will remain pending in the patent application.

Applicants would like to express appreciation for the Examiner's indication that claims 89-91 and 93-101 are allowed.

Claims 82-88, 92, and 102-109 were rejected under 35 U.S.C. §103(a) based on Owa *et al.* (US 2003/0025894A1) (hereinafter "Owa") in view of Takaoka (U.S. Pat. No. 6,137,626). The rejection is respectfully traversed.

Claim 82 recites a photolithography tool wherein, *inter alia*, first, second, and third cubic crystalline optical elements have a common lattice direction aligned parallel to the optical axis and the first, second, and third cubic crystalline optical elements have their respective crystal lattices selectively azimuthally rotated with respect to each other to reduce retardance over a substantial portion of the exit pupil, the first set of lobes of the first cubic crystalline optical element being selectively azimuthally rotated with respect to the second set of lobes of the second cubic crystalline optical element and the second set of lobes being selectively azimuthally rotated with respect to the third set of lobes of the third cubic crystalline optical element such that the first set of lobes, the second set of lobes, and the third set of lobes are oriented differently with respect to each other. As conceded by the Examiner on page 3, lines 19-22, and page 4, lines 1-4, of the Office Action, Owa does not disclose, teach or suggest this aspect of claim 82. The Examiner then relied on Takaoka as allegedly disclosing this feature. Applicants disagree and respectfully submit that (1) the proposed combination of Owa and Takaoka does not recite the claimed tool, (2) Owa teaches away from such an aspect and (3) there is no motivation to combine Owa and Takaoka or modify the teachings of Owa and/or Takaoka in view of the other.

Owa discloses a lithographic apparatus 30 including a light source, a reticle 31, and a projection system 41 comprising a plurality of lens elements 34-39. (See col. 4, paragraphs [0037]-[0040]). Owa discloses that the optical axis of a first group of lens elements is made to coincide with the crystal axis [100], that the optical axis of a second group of lens elements is made to coincide with the crystal axis [100] (or a crystal axis optically equivalent to the crystal axis [100]), and the first group of lens elements and the second group of lens elements

are rotated by 45° relative to each other. (See paragraph [0052]). Owa provides similar disclosure for groups of [111] lens elements rotated relative to each other by 60° and groups of [110] lens elements rotated relative to each other by 90°. (See paragraphs [0060] and [0067]). However, as identified by the Examiner, Owa does not disclose a photolithography tool as recited in claim 82. In fact, Owa teaches away from such a tool because Owa teaches that the optical axis of a third group of lens elements is made to coincide with a crystal axis different from that of the first and second group of lens elements (*e.g.*, [111] instead of [100]).

Takaoka fails to overcome the deficiencies of Owa. Takaoka discloses an optical system having a polarization compensation optical system and reducing retardance, through selective application of coatings. Takaoka completely fails to provide any disclosure, teaching or suggestion about cubic crystalline optical elements rotated azimuthally with respect to each other, let alone about first, second, and third cubic crystalline optical elements which have a common lattice direction aligned parallel to the optical axis and the first, second, and third cubic crystalline optical elements having their respective crystal lattices selectively azimuthally rotated with respect to each other to reduce retardance over a substantial portion of the exit pupil, the first set of lobes of the first cubic crystalline optical element being selectively azimuthally rotated with respect to the second set of lobes of the second cubic crystalline optical element and the second set of lobes being selectively azimuthally rotated with respect to the third set of lobes of the third cubic crystalline optical element such that the first set of lobes, the second set of lobes, and the third set of lobes are oriented differently with respect to each other. Therefore, while Takaoka may provide some general but different teaching regarding reduction of retardation in an optical system, any reasonable combination of Owa and Takaoka cannot result, in any way, in the apparatus of claim 82.

Furthermore, Applicants respectfully submit that there is no motivation or suggestion to combine the teachings of Owa and Takaoka or modify the teachings of Owa and/or Takaoka in view of each other. Takaoka discloses the use of a separate optical compensation system to compensate for the retardance between polarized light components passing through an optical system. (See col. 3, lines 43-67 and col. 4, lines 1-36). Takaoka does not disclose, teach or suggest, or even hint at, rotating the crystal lattices of optical elements in an optical system in order to reduce the retardance over a substantial portion of the exit pupil. For at least this reason, Applicants respectfully submit that there is no motivation or suggestion to

combine the teachings of Owa and Takaoka or to modify the teachings of Owa and/or Takaoka in view of the other. Therefore, it is submitted that the Examiner has not set forth a proper *prima facie* case of obviousness that would render claim 82 obvious by combining Owa and Takaoka or modifying the teachings of Owa and/or Takaoka.

For at least these reasons, claim 82 is allowable. Claims 83-88 are patentable over Owa, Takaoka, or a combination thereof, for at least the same reasons provided above related to claim 82 and for the additional features recited therein.

Claim 92 recites a method comprising, *inter alia*, orienting first and second cubic crystalline optical elements such that the first and second cubic crystalline optical elements have respective crystal lattices selectively azimuthally rotated about the optical axis such that a substantial portion of the retardance contributed by the first cubic crystalline optical element is substantially orthogonal to a substantial portion of the retardance contributed by the second cubic crystalline optical element so as to substantially cancel and reduce retardance within the optical system. As conceded by the Examiner on page 6, lines 7-12 of the Office Action, Owa does not disclose this feature. The Examiner then relied on Takaoka to contend that this aspect of claim 92 would have been obvious. Applicants disagree and respectfully submit that (1) the proposed combination of Owa and Takaoka does not recite the claimed method and (2) there is no motivation to combine the teachings of Owa and Takaoka or modify the teachings of Owa and/or Takaoka in view of the other.

Specifically, Takaoka fails to overcome the deficiencies noted by the Examiner. As noted with respect to claim 82, Takaoka merely discloses an optical system having a polarization compensation optical system and reducing retardance, through selective application of coatings. Takaoka completely fails to provide any disclosure, teaching, or suggestion about cubic crystalline optical elements rotated azimuthally with respect to the other, let alone orienting first and second cubic crystalline optical elements such that the first and second cubic crystalline optical elements have respective crystal lattices selectively azimuthally rotated about the optical axis such that a substantial portion of the retardance contributed by the first cubic crystalline optical element is substantially orthogonal to a substantial portion of the retardance contributed by the second cubic crystalline optical element so as to substantially cancel and reduce retardance within the optical system. Therefore, while Takaoka may provide some general and different disclosure regarding reduction of retardation in an optical system, any reasonable combination of Owa and Takaoka cannot result, in any way, in the method of claim 92.

Furthermore, as discussed in relation to claim 82, Applicants respectfully submit there is no motivation or suggestion to combine the teachings of Owa and Takaoka or modify the teachings of Owa and/or Takaoka in view of each other. Takaoka discloses the use of a separate optical compensation system to compensate for the retardance between polarized light components passing through an optical system. (See col. 3, lines 43-67 and col. 4, lines 1-36). Takaoka does not disclose, teach or suggest, or even hint at, rotating the crystal lattices of optical elements in an optical system in order to reduce the retardance within the optical system. For at least this reason, Applicants respectfully submit that there is no motivation or suggestion to combine the teachings of Owa and Takaoka or to modify the teachings of Owa and/or Takaoka in view of the other. Therefore, it is submitted that the Examiner has not set forth a proper *prima facie* case of obviousness that would render claim 92 obvious by combining Owa and Takaoka or modifying the teachings of Owa and/or Takaoka. For at least these reasons, claim 92 is allowable.

Claim 102 recites a cubic crystalline optical system where, *inter alia*, two cubic crystalline optical elements have their respective different crystal lattices selectively rotated with respect to each other and about the optical axis to reduce retardance within the optical system. As conceded by the Examiner on page 7, lines 5-7 of the Office Action, Owa does not disclose this aspect of claim 102. The Examiner then relied on Takaoka to contend that this aspect of claim 102 would have been obvious. Applicants disagree and submit that (1) the proposed combination of Owa and Takaoka does not recite the claimed system and (2) there is no motivation to combine the teachings of Owa and Takaoka or modify the teachings of Owa and/or Takaoka in view of each other.

Specifically, Takaoka fails to overcome the deficiencies noted by the Examiner. As noted with respect to claim 82, Takaoka merely discloses an optical system having a polarization compensation optical system and reducing retardance, through selective application of coatings. Takaoka completely fails to provide any disclosure, teaching, or suggestion about cubic crystalline optical elements rotated azimuthally with respect to the other, let alone at least two different cubic crystalline optical elements each having a different lattice direction aligned along a common optical axis, the two cubic crystalline optical elements having their respective crystal lattices selectively rotated with respect to each other and about the optical axis to reduce retardance within the optical system. Therefore, while Takaoka may provide some general and different disclosure regarding reduction of

retardation in an optical system, any reasonable combination of Owa and Takaoka cannot result, in any way, in the system of claim 102.

Furthermore, as discussed in relation to claim 82, Applicants respectfully submit there is no motivation or suggestion to combine the teachings of Owa and Takaoka. Takaoka discloses the use of a separate optical compensation system to compensate for the retardance between polarized light components passing through an optical system. (See col. 3, lines 43-67 and col. 4, lines 1-36). Takaoka does not disclose, teach or suggest, or even hint at, rotating the crystal lattices of optical elements in an optical system in order to reduce the retardance within the optical system. For at least this reason, Applicants respectfully submit that there is no motivation or suggestion to combine the teachings of Owa and Takaoka or to modify the teachings of Owa and/or Takaoka in view of the other. Therefore, it is submitted that the Examiner has not set forth a proper *prima facie* case of obviousness that would render claim 102 obvious by combining Owa and Takaoka or modifying the teachings of Owa and/or Takaoka.

For at least these reasons, claims 102 is allowable. Claims 103-109 are patentable over Owa, Takaoka, or a combination thereof, for at least the same reasons provided above related to claim 102 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 82-88, 92, and 102-109 under 35 U.S.C. §103(a) based on Owa in view of Takaoka are respectfully requested.

The rejection having been addressed, Applicants respectfully submit that the application is in condition for allowance, and a notice to that effect is earnestly solicited.

If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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